Available online at www.sciencedirect.com
ScienceDirect
Procedia - Social and Behavioral Sciences 162 (2014) 330 – 339
Procedia
Social and Behavioral Sciences

XVIII Congreso Panamericano de Ingeniería de Tránsito, Transporte y Logística (PANAM 2014)

Public perception of selected road safety problems

Miroslava Mikušová, Patrik Hrkút*

SOL Project manager, Faculty of Operation and Economics of Transport and Communications, University of Žilina, Univerzitná 8215/1, 010 26 Žilina, Slovakia
Professor Assistant,Faculty of Management and Informatics, University of Žilia, Univerzitná 8215/1, 010 26 Žilina, Slovakia

Abstract

The paper contains overview of current situation in the area of European road safety and draws attention to adverse developments in several European countries. Based on the analysis of data provided the approach of international project SOL is presented. This approach is focused on strengthening road safety management capacity in the regions of Central Europe and its integral part is road safety situational assessment. The process of application of this tool in selected regions of project partners' countries is presented. It is clarified the role of knowledge and opinion survey within the assessment together with methodology and procedure for implementing the survey. Also results and main outcomes related to the travel preferences, mobility, public attitudes towards problems and risk factors of road safety and potential effectiveness of authorities in the Žilina region in Slovakia are provided.

Peer-review under responsibility of PANAM 2014.
Central Europe; road safety; survey; citizens; SOL project

1. Introduction

The degree of road transportation and motorization is constantly increasing. Apart from the undoubted advantages, it causes a heavy loading of the road network and constantly increasing demands on traffic and its safety. Road safety actually is not only an important traffic and social issue but also an economic one.

There is universal recognition of the tremendous global burden resulting from road traffic crashes, and that road traffic injuries constitute a major but neglected public health problem that has significant consequences in terms of mortality and morbidity and considerable social and economic costs. According to the WHO and the World Bank

* Miroslava Mikusova. Tel.: +421-41-513-3562; fax: +421-41-513-1527.
E-mail address: mikusova@fpedas.uniza.sk

Peer-review under responsibility of PANAM 2014.
doi:10.1016/j.sbspro.2014.12.214

(World Health Organization, 2009), a multi-sectorial approach is required to successfully address this problem. While the number of deaths and seriously injured people is falling, studies have shown that faster progress is possible if all effective means are applied.

Road crashes and road crash injury are no longer seen as "an inevitable outcome of road transport" but rather as "largely preventable and predictable". A core component of this "new paradigm" is the recognition that road safety is a multi-sectorial issue and a public health issue – all sectors need to be fully engaged in responsibility, activity and advocacy for road crash injury prevention. Good infrastructure and vehicles must be complemented with common sense everyday human behaviours and effective trauma care services (Jost, Allsop, & Steriu, 2012).

2. European road safety situation

Road safety is a major societal issue in Europe because about 80% of Europeans live in cities. European cities are suffering heavily from congestion high levels of pollution, noise, and road crashes, largely caused by excessive use of the private car. Road strategy depends greatly on how communities choose to manage their transport systems in relation to their overall health and safety objectives and how they are balanced with economic, social and environmental considerations (Attwell, Glase, & McFadden, 2011). The growing trend away from public transport, walking and cycling towards motorized transport has marked a move towards modes and means of transport that pose comparatively higher costs to society economically, environmentally, and in health terms (Wegman & Siem, 2010).

In 2007, for the first time since 2001, the number of people killed on European roads has not decreased in comparison with the previous year (OECD/ITF, 2012).

As we can observe in table 1 in Western Europe the number of road traffic fatalities declined in 2007 by 1.2%. However this decrease was accompanied by a rise in both the number of casualties (+1.4%) and the number of accidents (+5.6%). These data was strongly influenced by the performance of Turkey which has shown significant increases in all three indicators. In 2007, only the United Kingdom and Greece recorded drops in the number of fatalities, casualties and injury accidents. At the same time Denmark, Finland and Sweden have seen their road fatalities increase by 32.7%, 13.1% and 5.8% respectively.

Table 1. Road fatalities in Western Europe

Western Europe	Number of fatalities					
	2007	2008	2009	2010	2007 -2006 (%)	2010 -2011 (%)
Austria	691	679	633	552	-5.3	-6
Belgium	1 067	944	944	812	-0.2	4
Denmark	406	406	303	255	32.7	-13
Finland	380	344	279	272	13.1	7
France	4 620	4275	4 273	3 992	-1.9	-1
Germany	4 949	406	303	255	-2.8	-13
Greece	1 578	1 555	1 456	1 258	-4.8	-13
Ireland	338	280	239	212	N/A	-12
Luxembourg	43	35	48	32	19.4	13
Malta	12	15	21	15	9.1	13
Netherland	791	677	644	537	-2.5	4
Norway	233	N/A	212	208	-3.7	N/A
Portugal	854	885	840	937	0.5	-7
Spain	3 823	3 100	2 714	2 479	-6.8	-6
Sweden	471	397	358	266	5.8	18
Switzerland	384	357	312	327	3.8	N/A
Turkey	5 004	N/A	N/A	N/A	8.0	N/A
UK	3 059	2 645	2 337	1 905	-7.2	6

In 2010 considerably changed and we can observe positive decreasing trend in number of fatalities, casualties and injury accidents in more western European countries - France, Austria, Spain, Portugal Ireland, Denmark and Germany. At the same time decreased also number of fatalities in Greece, but number of accidents and injuries raised. Sweden, Luxembourg and Malta have been confronted with a rise in the number of fatalities on their roads by 18% and 13% respectively.

According to the data from table 2 in Central and Eastern Europe the number of road fatalities increased by 6.4% in 2007. This result is all the more disappointing since the region recorded at the same time strong increase in the number of casualties (+6.4%) and number of accidents (+6.7%). With the exception of Bulgaria, Estonia, Hungary and Lithuania, which show a drop in road fatalities, casualties and injury accidents, all other countries have been confronted with a rise in the number of fatalities on their roads.

In 2010 situation changed for Lithuania, the Czech Republic, Slovakia, Hungary, Romania and Serbia that experienced decrease of the number of fatalities, accidents and injuries on their roads, with exception of Latvia, which shows decrease of the number of fatalities but a drop in road casualties and injury accidents. Countries like Estonia, Poland, Bulgaria and Slovenia saw their fatalities increase by 29%, 7%, 4% and 2% respectively.

Table 2. Road fatalities in Central and Eastern Europe

Central and Eastern Europe	Number of fatalities					
	2007	2008	2009	2010	2007 -2006 (%)	2010 -2011 (%)
Albania	384	N/A	N/A	N/A	38.6	N/A
Bulgaria	1 006	944	944	812	-3.5	4
Croatia	619	N/A	N/A	N/A	0.8	N/A
Czech Repub.	1 222	1076	901	802	15.0	-4
Estonia	196	132	98	78	-3.9	29
Hungary	1 232	996	822	740	-5.4	-14
Latvia	419	316	254	218	2.9	-18
Lithuania	740	449	370	299	-2.6	-1
Poland	5 583	5 437	4 572	3 908	6.5	7
Romania	2 794	3 061	2796	2 377	12.8	-15
Serbia	962	905	810	656	6.9	N/A
Slovakia	661	622	380	371	8.7	-13
Slovenia	293	214	171	138	11.8	2

According to statistics published by The European Commission in the summer 2011, EU road fatalities decreased by 11% in 2010. In 2011 - the first year of the 2020 Road Safety Target - the overall number of road deaths decreases compared with precious year but reduction slows down (to -2%). This was the slowest decrease in road deaths in a decade (wide reduction throughout the last decade was on average -6%). However country by country statistics show that the number of deaths still varies greatly across the EU. Whereas in some European countries the road safety situation has improved constantly over the past decades, in many others the road safety challenge has not been addressed so successfully and number of road fatalities is still very high.

This road safety challenge has reached a magnitude that even puts the overall competitiveness, the attractiveness as location for working and investments as well as the quality of life in the most seriously affected parts of the cooperation area at considerable risk. Road crashes have a severe negative impact on the social and economic situation in respective countries, costing up to 2% or more of the GDP (Ward & Billingsley, 2006).

3. Project SOL

Based on the findings previously presented above the SOL project initiative was created. The project was launched in April 2010 and has duration of 3 years.

SOL was a project co-financed by the European Programme of Territorial Cooperation “Central Europe” (CEE). It involves 8 countries of Central Europe area: Germany, Italy, Austria, Slovenia, Poland, Czech Republic and Hungary. It represents a significant regional road safety programme that is contributing to the global road safety

with critical knowledge, experience and tools.

Basic objective of the project was enhancing capacities of local and regional stakeholders to prevent road accidents in Central Europe. Its main goal was jointly develop a strategy of road safety that will support the Central European regions in catching up with highest EU standards in road safety, specifically:

- Assess the problem, policies and institutional settings relating to road safety and the capacity for road injury prevention.
- Strengthen institutions and create effective horizontal and vertical multi-sector partnerships.
- Prepare regional/local strategies and action plans and allocate endogenous resources to address the problem.
- Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences.
- Create a greater level of awareness, commitment and informed decision-making at all levels.
- Develop replicable tools for central European space and the EU.
- Put road safety policies in the context of promoting sustainable forms of mobility.

The project aimed at giving professional qualities, experiences and tools to local public administrations to increase the road safety in their competence areas. It is based on pyramid model shown in Figure 1.

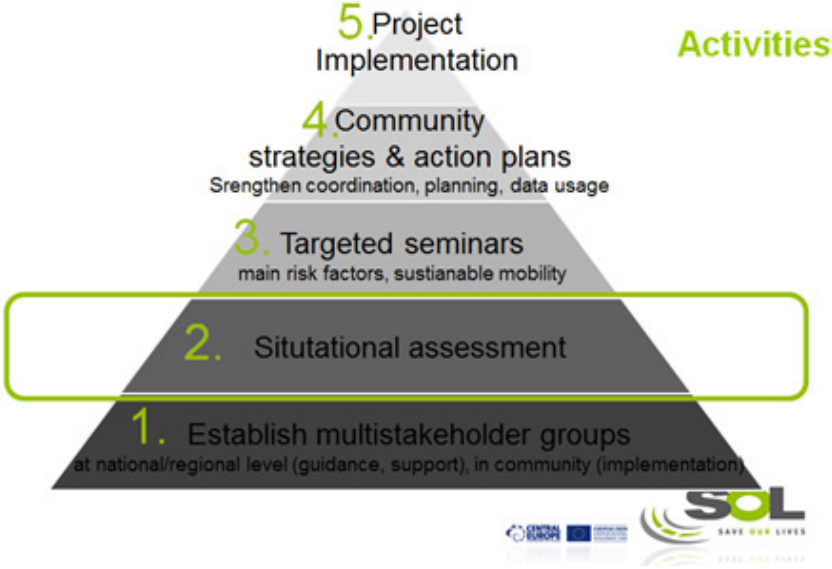
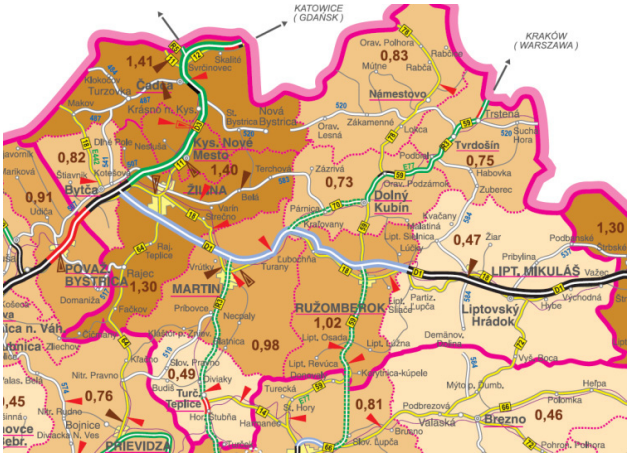


Fig. 1. Pyramid model of the SOL project activities

In following text application of second step of this model in Žilina region is presented, focusing on the part related to the conduction of road safety public knowledge and opinion survey.

4. Road safety situational assessment of the Žilina region

Žilina region which is located in the northwest part of Slovakia crosses several significant roads. These roads allow a connection of states: Hungary, Austria, Poland and Czech Republic. Especially roads- E50, E75, E78, and E442 are the most loaded roads in Slovakia - according to the nationwide traffic census on the road network of the Slovak Republic which was realized in 2010. High values of traffic intensity also impact on the value of traffic accidents in the region. The negative trend of accident rate in the Žilina region is the main reason for participation in the project SOL, whose implementation should contribute to solving its problems in the area of road safety.



National traffic accidents density (DTA) on the 1st, 2nd and 3rd class roads: 0,63 TA km-1year -1

District traffic accidents density (DTA) on the 1st, 2nd and 3rd class roads (TA km-1year -1):

Fig. 2. Density of traffic accidents in counties of Žilina region

The SOL project aims to prevent road crash deaths and injuries and increase sustainable mobility in the participating SOL communities in Central Europe by supporting the development of targeted strategies, up-skilling road safety professionals, implementing effective road safety interventions and building a transnational road safety network. Realization of the SOL situational assessment was central to the delivery of activities presented.

This assessment was undertaken in selected regions of SOL project partners' countries. Within Slovakia Žilina region was selected because of high traffic accidents density (see Fig. 2). The objective of the SOL community situational assessment developed in this region was to compile and present the data needed to assess and evaluate its current road safety situation, including road crash and injury data, institutional capacity, public opinion and knowledge survey, stakeholder map and main conclusions from the analysis.

The assessment leaded to identification of priority issues for action and served as a baseline for monitoring and evaluation of the impact of the SOL project and its interventions in Žilina region. The purposes of its four categories are described in Table 3.

Table 3. Parts of road safety situational assessment

Category	Purpose of the assessment
Road safety assessment	To strengthen understanding of the road crash and road crash injury situation in specific geographical area of the pilot community. The information is vital for road safety management and advocacy purposes.
Institutional capacity assessment	To understand institutional strengths/gaps for delivering and managing a systems approach to road safety including multi-stakeholder interventions and for encouraging safe and sustainable mobility. To understand training needs of road safety professionals and community road safety stakeholders.
Public opinion survey	To understand public knowledge, opinion about road safety, and to understand travel preferences. The road safety plan must be acceptable to the local population. The results will help in preparation of the road safety plan reflecting on expectations of the local population.

Stakeholder map	To identify stakeholders in the community who are crucial to the success of the SOL project in the community, who are active in road safety in the community and can participate in the SOL community teams and who can contribute to delivery of the SOL and community road safety objectives.

One of main parts of road safety assessment was conduction of public and opinion survey among the Žilina region citizens.

4.1. Public knowledge and opinion survey on road safety and travel preference

The main objectives of the public opinion and knowledge survey for the SOL project were to understand respondents' attitudes regarding primarily:

- travel preferences and the link between road safety and sustainable mobility,
- general road safety attitudes, such as the perception of risks of a road crash by a pedestrian, cyclist, in comparison to other risks,
- perception of child injury risks in traffic,
- biggest risk factors in a region and whether a government is tackling road safety issues well enough.

The survey outcomes are to be used to support the strategy of development and for advocacy purposes (the importance of the survey as an advocacy tool to show the local government, in particular, the concerns, opinions and views of the public in relation to road safety and mobility issues).

4.2. Methodology and implementation of the survey

The survey was conducted in June 2012 with a use of quantitative method and by means of an on-line questionnaire. The questionnaire was prepared in cooperation with Motor Transport Institute in Warsaw and with all SOL project partners. The external subcontractor and coordinator of the survey was Agencja Psyche (Psyche Agency). The external consultancy allowed immediate preparation of the Internet survey platform and faster data collection. After the development of the questionnaire, it was translated into all languages of the project partner countries, and then placed on a special platform used for on-line surveys powered by mysurveylab.com.

A link to survey was distributed by different channels, among others, by means of emails sent to local entities (universities, local authorities, companies, private persons), emails sent to local mass media representatives (request for placing a link on their pages), social media (e.g. Facebook), message sent to all relevant users of the Euro26 card and direct local activity of SOL partners.

4.3. Basic data about the sample of respondents

The survey covered 7 EU countries with results coming from 2956 people who filled in the questionnaire. In Table 4 a list of locations together with information on a number of participants in individual countries is provided. According to the directives in case of two countries – Slovakia and Slovenia the data were divided into regions covered by the survey. There were also 235 people who did not declare the location or were from the territory different from the listed. These data were not analysed. The total number of analyzed responses was 2721.

Number of respondents who filled in the online questionnaire was 453 for the Žilina region (Slovakia) out of total 2721 respondents. The average age of the respondents was 30,5 years with the following educational structure: primary education – 15,9%, secondary grammar school education – 8,8%, secondary school education – 18,1%, vocational secondary education – 4,6%, higher education – 52,2%. In this sample, 66,3% of the respondents had

driving license with the average 10,1 years of driving experience and the average annual car kilometres driven – 23365 km.

Table 4. Survey locations and number of participants

Country	Region	No.
Austria	Steiermark	211
Czech Republic	Liberec Region	205
Hungary	Gyor	486
Italy	Eastern Lombardia (Mantua, Brescia, Cremona,	459
Poland	Warmia-Mazury Region	253
Slovenia	Tolmin	116
Slovenia	Kocevje	183
Slovenia	Maribor	231
Slovakia	Zilina Region	453
Slovakia	Presov Region and the city of Presov	124

4.4. Outcomes of the survey

The public knowledge and opinion survey on road safety and travel preference conducted in Žilina region was divided in three main parts: A. Travel preferences and mobility characteristics, B.General Road Safety Attitudes and C.Risk Factors. In the following paragraphs, a short overview of the results for each question category is provided.

A. Travel preferences and mobility characteristics

Travel mode to work and school

Results of the Žilina region survey showed that the typical way to school /work is by car (45%) or bus (41%). Significantly fewer respondents go to work or school by train (14%), bicycle (5%) or motorcycle (0%). 26% of the respondents travel to school on foot and 0,7% of all respondents don´t travel to work or school. It should be remembered, that in case of this question it was possible to mark few answers. That is the reason the percentage rate does not add to 100%.

Distance to the civil facilities

The survey participants were also asked to estimate the distance (in kilometres) from their home to many different places with civil facilities. When estimating the distance, respondents taken into account all their movements within the ordinary calendar day. In Žilina region the respondents indicated that the longest average distance is to school or work (19,4 km). The distance to significant public offices is much shorter (7,66 km), as well as the one to the nearest post office (5,2km). The shortest distance Žilina inhabitants have to public transport stations (4,1 km) and local shops (3,3 km). The total estimated average distance traveled by the respondents during the calendar day was 30,1 km.

The assessment of public transport quality

The survey respondents evaluated the level of selected quality characteristics of the public transport with the values from 1 to 7. The value around "1" meant poor and around "7" very good quality of services provided by carriers. In Žilina region the highest score relates to accessibility (4,70), punctuality (4,36) and safety (4,38). The comfort had a lower score (3,63), as well as draft timetable (3,68). With a use of 7-point scale, the quality of public passenger transport is valued as average and in case of comfort and draft timetable as below-average.

B. General Road Safety Attitudes

Road infrastructure safety

The respondents evaluated roads safety in their region providing an approximate score of 3,62 (their answer to question: “How safe are your region’s roads to travel on?”). The respondents evaluated the situation when roads were considered to be dangerous with score "1" and roads which were considered to be safe with score "7". Based on the calculated average values of the survey respondents, the roads in Žilina region are considered as more or less dangerous.

Impact assessment of the selected measures on road safety

The question: "Do you think that the solutions given below contribute to increasing road safety?" made possible the quantification of selected measures impact to increase road safety. In this question the respondents evaluated their attitude towards different statements concerning road safety, with a use of 7-point scale (1 – I do not agree at all, 7 – I agree completely). In Žilina region the most efficient ways to improve road safety were listed as follows: using child restraints (5,76), using safety belts (5,35), and making drink-driving laws more strict (5,40). Less people indicated existing speed limits (4,82) and speed cameras (4,53).

Changes in the used model of road safety

Respondents´ incentives on making changes under the current model of road safety were identified by question "What should be changed in order to increase road safety (police checks/fines/publicity and advertising)?" This question was focused on changes in the system of police checks, the system of fines, publicity and advertising. The respondents indicated if an individual factor of influence should be increased or decreased, or remain at the same level. In Žilina region the data show that in case of police enforcements the respondents are divided – almost equally – almost half of them think that the measures should remain at the same level (45%) and some that they should be intensified (41%). When it comes to penalties for breaking road safety laws – they should rather remain at the same level (47%), although some people would like them to be higher (30%). In case of publicity and advertising regarding road safety issues, most of the respondents think that it should be increased (70%), however, there is a group of people claiming that the current actions in that matter are sufficient (26%).

C. Risk Factors

Public perception of road situation

The respondents answered the following question according to a 7-point scale: “To what extent do you agree with the following statements?” (1 – total disagreement, 7 – total agreement). Based on the average value of respondents´ assessments, specific statements of direct agreement or disagreement with these statements are not confirmed. Respondents agree with the statement that are responsible for "what happens on the road" (4,79), tend to agree with statements that "dangerous situations on the road happen to us because of our fault" (4,21), as well as "I often feel that I do not have influence on things that happen to me on the road" (4,09). The statement "some people do not have luck in life and as well they don´t have it on the road" other respondents more or less don´t agree (3,09). It is quite cleat that respondents from Žilina region are aware of their impact on road safety.

Breaking of the traffic laws

By answering the question "How often in recent months...?" respondents evaluated the frequency of breaking the basic road safety principles. Seven-point rating scale was used for the evaluation (1 – never 2 – very rarely, 3 – rarely 4 – occasionally, 5 – often 6 – very often, 7 – always).

Among the negative behaviour included in the questionnaire, the respondents from Žilina region mainly indicated exceeding the speed limit (3,87), transporting passengers who hadn't had their safety belts fastened (3,50), transporting children without child restraint system (3,29), or going by car without safety belts fastened (2,86). It also happened that the drivers were driving under the influence of alcohol (2,54). Efficiency of authorities in the scope of road safety in the region.

Infrastructure for pedestrians and cyclists

Assessment of the infrastructure existence for pedestrians or cyclists was the content of the question: "Do you think there is a sufficient number of the following in your area?", where respondents evaluated the infrastructure according to 7-point scale (1 – missing infrastructure, 7 – good quality of infrastructure). Žilina region respondents perceive the infrastructure for pedestrians and cyclists, with the exception of pedestrian crossings (4,0), as not sufficient and in case of infrastructure for cyclists as almost not satisfactory.

Traffic control

The average number of traffic controls that respondents from Žilina region were subject to was almost two (1,91) during previous year. The chance of being stopped for traffic offences was 4,24 in Žilina region, evaluated according to a 7-point scale (1 – very little chance, 7 – very a strong chance of penalty for performed offence). In practice it means that if the participant is involved in traffic offense, he/she will be fined with the probability slightly higher than 50%.

The will of public to change habits

The questions "Would you walk/cycle more often if…" aimed at identification of factors which contribute to walking/cycling. The factor that would influence it most in Žilina region concerns more careful drivers (4,56) and better lightening of streets (4,14). The other factors were: improvement of sidewalks (3,97), safety monitoring (3.83) and smaller distance between pedestrian crossings (3,60). The factor that would influence cycling more, concerns development of more bicycle lines (5,19). The following issues were less significant: more lighting on streets (4,56) and more bicycle racks/parking.

4.5. Summary of survey results

Public opinion and knowledge survey conducted in Zilina region with support of the SOL project identified following:

- In this region a similar number of respondents get to work/school by car or by bus (over 40%), every fourth go on foot, and 14% go by train. Only few survey participants ride a bike (5%).
- The inhabitants of this region have the longest distance to work/school (almost 20 km), and the shortest one to the local shops (over 3 km). Public offices can be reached within a long distance (almost 8 km), and the nearest public transport station within 4 km.
- All of the scores provided for evaluation of the public transport are average. The best score relates to accessibility, the worst one to comfort.
- The safety of roads in this region was evaluated as average – 3.62.
- The respondents believe that the factor that contributes the most to safety on roads is usage of child restraint system, and the factors that have the smallest influence are speed cameras and existing speed limit. However, all of the factors included in the questionnaire were perceived as significant (above the average).
- The majority of respondents claim that it is necessary to intensify publicity and advertising regarding road safety issues. At the same time, a similar number of survey participants (over 40%) believe that police enforcements should be increased or remain at the same level. When it comes to penalties for breaking road

safety laws a little more respondents believe that they should remain at the same level, than be increased.

- According to the respondents, road safety mainly depends on the behaviour and culture of road users. Nevertheless, other factors also seem to be important for them (mean: over 5).
- Questions concerning the perception of road situation showed that the respondents have low sense of control on that what is happening on the road, and it often depends on luck, or its lack.
- Among negative behaviours included in the questionnaire the respondents mainly indicate exceeding speed limit, and they rarely drive under the influence of alcohol or without safety belts fastened (however, these scores are also high).
- The respondents evaluated the infrastructure, in their region, for pedestrians and bikers as average. The best score relates to zebra crossings and sidewalks, the worst to the number of bike lanes and bicycle racks/parking.
- The survey participants are stopped for a traffic control on average almost twice a year (1.91). They also estimate chances of being stopped for such a control as quite high – 4.24.
- The respondents will be more willing to walk if the drivers were more careful. Other factors were perceived as of average importance.
- The respondents will be more willing to cycle if the number of bike lines was higher. Nevertheless, other factors were also perceived as important.

5. Conclusions

Experience from countries with the best road safety records showed that road safety measures can only be successful when supported by the public (Mikusova, 2011). Getting pubic support is therefore vital to road safety and there is nothing worse that installing road safety schemes that have to be subsequently removed because the local population does not accept them.

It is also the case that road safety measures will be more successful when the local population is actively supportive, and demanding that something be done. It is important to know where and when road safety initiatives have the best chance of public support and hence success.

Data collection for the survey presented in this paper was very limited in time (10 days long on-line survey) therefore it was possible to collect only limited number of answers from respondents representative for each region. Despite the fact that the statistical significancy of the survey results could be questionable, it is posible to conclude that conducted survey gave a comprehensive picture of mobile preferences and daily behavior in traffic in the selected regions. The study gave also a picture of risks and road safety perception among respondents. These findings need to be taken into account in the road safety draft strategy and action plans to address crucial problems of road safety in the regions. Outcomes of presented public opinion survey will certainly help in solving the serious road safety problems, when the appropriate alternative solutions will be selected.

Acknowledgements

This paper is supported by the following project: University Science Park of the University of Zilina (ITMS: 26220220184) supported by the Research & Development Operational Program funded by the European Regional Development Fund.

References

Attwell, R.G., Glase, K., McFadden, M. (2011). *Enforcing legislative and regulatory prevention strategies.* Hazard, 34, 7-12.

Jost, G., Allsop, R. & Steriu, M. (2012). A Challenging Start towards the EU 2020 Road Safety Target – 6th Road Safety PIN Report.

Mikusova, M. (2011). Value of networking in transport policy related to the road safety. In: *Modern transport telematics, Jerzy Mikulski (Ed.)11th International Conference on Transport Systems Telematics, TST 2011, Katowice-Ustron, Poland, October 2011,* Selected Papers, Germany: Springer-Verlag, 70-77.

OECD/ITF (2012). *Road Safety Annual Report 2011*. IRTAD - Interantional Traffic Safety Data Analysis Group.

Ward, D. & Billingsley, S. (2006). *Make roads safe – Time for action.* Commission for Global Road safety. London.

Wegman, F. & Siem, O. (2010). Benchmarking road safety performances of countries. *Safety Science,* 48, 59-64.

World Health Organization (2009). *Global status report on road safety: Time for action.* Geneva, Switzerland.